U.S. FISH AND WILDLIFE SERVICE

ANALYSIS OF SALMON AND STEELHEAD STOCK STATUS ON THE OLYMPIC PENINSULA, WASHINGTON

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INTRODUCTION

There is estimated to be 40 stocks of salmon and steelhead trout in rivers draining the Olympic Peninsula, Washington. The Endangered Species Committee of the American Fisheries Society, in an article published in Fisheries, has identified 214 stocks of Pacific salmonids as either having a high or moderate risk of extinction or are of special concern (Nehlsen et al. 1991). Sixteen of these stocks are in the Olympic Peninsula. It is ironic that in an area of the Northwest that is sparsely populated, with much land in either National Park or National Forest, salmon runs are in jeopardy. This can generally be traced to overharvest, poaching, poor forest practices, dams, habitat loss or degradation, and conflicts between hatchery and wild stocks, not necessarily in that order.

Affording protection to stocks under authority of the Endangered Species Act is not presently seen as a helpful or necessary measure at this time. However, drastic action is needed to prevent further depletion of some runs and bold steps will be required to restore presently depleted runs. Full management protection of the fish and its habitats is the only measure that will ensure restoration of the most depleted stocks (Hood Canal coho are a current example). An important fact in salmonid restoration is acceptance that restoration will be slow; because salmon life-cycles range from 3 to 5 years, a number of years are required to see the results of restoration. In some cases, relatively quick restoration might be possible through drastic curtailment of fishing. However, this would cause significant economic loss to coastal communities and massive over-escapement at some hatcheries.

The U.S. Fish and Wildlife Service presently has developed several fishery restoration initiatives that will aid in the general battle to protect, enhance, and restore the Olympic Peninsula, as well as other salmon stocks and its habitats. Specific Olympic Peninsula fishery and habitat restoration initiatives are estimated to cost $355,000 and 7 staff annually for the U.S. Fish and Wildlife Service over the next ten years to complete the specific Olympic

Peninsula salmon and steelhead restoration projects described. Further, the Chehalis River Basin Fishery Resources Study and Restoration Act (Public Law 101-452) will require $825,000 (and 2 staff) in Fiscal Year 1992 to complete requirements of that Act. Significant salmon restoration could also occur if removal of the dams on the Elwha River is accepted. Funding of these projects will likely forestall the need to list salmon and steelhead stocks under the Endangered Species Act.

This report is a review of the status of each major stock suffering a decline from expected natural productivity. Causes for decline, current protective or restorative measures, prospects for the future, and needs to ensure survival are also addressed. The report does not address those stocks generally considered to be healthy and does not account for the large salmon and steelhead production from Federal, State, and Tribal hatcheries on the Olympic Peninsula.

STATUS OF STOCKS AND RESTORATION NEEDS

TRIBUTARIES DRAINING INTO HOOD CANAL

Hood Canal salmon management is driven by the Hood Canal Salmon Management Plan, approved by a Federal court. Under the Plan, Washington Department of Fisheries (WDF), the Point No Point Treaty Council (PNPTC), and the U.S. Fish and Wildlife Service (FWS) cooperatively manage salmon. This Plan designates primary and secondary management of stocks and periods for harvest management. Since the various stocks sometimes overlap in run timing and harvesting, this approach means that some wild stocks, such as fall chinook salmon, may not be protected.

SPRING CHINOOK: The Skokomish River once supported healthy runs of spring chinook salmon (Pavel 1986). They are now gone from the river (Boomer 1990). It is also believed that the Dosewallips River had runs of spring chinook at one time but there are now only remnant runs (Pavel 1986).

Since 1978, the FWS has been attempting to develop a spring chinook salmon broodstock at Quilcene National Fish Hatchery on Hood Canal. The ultimate goal of this program was to develop this stock to reintroduce spring chinook to Hood Canal rivers. Thus far, however, marine survival and returns to the hatchery have been poor (Hiss et al. 1988).

In 1989, the FWS entered into an agreement with WDF and the PNPTC called the Hood Canal Production Evaluation Program designed to evaluate the feasibility of using Soleduck River spring chinook salmon to build the broodstock for eventual planting in Hood Canal streams. This is being done by importing eyed eggs to both Quilcene National Fish Hatchery and WDF's Hood Canal Hatchery and by splitting the Quilcene National Fish Hatchery spring chinook production between the two hatcheries. Through the comparison of relative survival under these four conditions, conclusions can be made about which of the two stocks and which of the two locations has the best promise for success.

Until this investigation is completed, the outlook for restoration of the Hood Canal spring chinook salmon is uncertain. At a minimum, it will be several decades before restoration of the stocks will be complete.

Recommendations: 1) Continue Hood Canal Production Evaluation Program. 2) Assess status of wild stocks in Dosewallips River and determine whether a wild brood source exists ($10,000; 0.2 Full Time Equivalent (FTE)).

FALL CHINOOK: Hood Canal fall chinook salmon are managed as a hatchery stock (WDF et al. 1986). Hatcheries release 6.7 million juvenile fall chinook into Hood Canal each year (WDF et al. 1986). A major effort is being made by WDF to increase the sport fishery for fall chinook by increasing hatchery production and by using net pens in Hood Canal (WDF 1989). Wild stocks in Hood Canal cannot withstand the hatchery harvest rate. There may be ways in which the wild stocks can be protected from extinction but further investigation is required to find out.

Recommendation: Assess status of Hood Canal wild stocks and make restoration recommendations ($10,000; 0.2 FTE).

COHO: Hood Canal coho salmon are managed on a wild-stock basis (WDF et al. 1986). In recent years, it has often been a constraining stock in ocean and Straits of Juan de Fuca salmon fisheries (e.g., PFMC 1989, PFMC 1991a). Part of the problem is that they are incidentally harvested with chum salmon in mixed stock fishing areas. Another problem is an intensive coho sport fishery in the Straits of Juan de Fuca. In 1991, for the first time ever, Strait of Juan de Fuca sport fisheries will be closed for two weeks in early September to protect Hood Canal coho.

Hood Canal coho salmon are produced by WDF's George Adams and Hood Canal Hatcheries. They are theoretically released only at a level designed not to conflict with wild stocks (WDF et al. 1986). About 700,000 coho smolts are released from Quilcene National Fish Hatchery per year. These make good contributions to sport and commercial fisheries (Knudsen et al. 1989) and do not conflict with wild coho because of their early run timing.

Northeast Olympic Peninsula drainages have been stocked with Quilcene National Fish Hatchery coho salmon fry for a number of years. Fishery managers do not presently know whether this program is helping the wild coho production or not. There are preliminary indications from other areas that this kind of supplementation is not helpful (Miller et al. 1990).

Recommendations: 1) Continue utilizing measures to protect coho salmon including restrictions on sport fishing and on coincidental chum fishery. 2) Initiate a FWS program to assess the status of wild coho cooperatively with WDF and PNPTC and make restoration recommendations ($10,000; 0.2 FTE). 3) Initiate a FWS program to evaluate the efficacy of planting hatchery coho fry in the Olympic Peninsula streams ($25,000; 0.5 FTE).

EARLY CHUM SALMON: These stocks have secondary management status (WDF et al. 1986) and have been diminished due to conflicts with chinook salmon management.

Recommendation: Assess status of early-timed Hood Canal chum salmon and develop recommendations to restore this stock into Hood Canal tributaries ($10,000; 0.2 FTE).

DUNGENESS RIVER

The Dungeness River salmonid habitat suffers from low summer flows due to irrigation withdrawals (Hiss 1987), substrate instability due to a large buildup of gravel, and from poor forest practices. The Dungeness River Management Team, having representation from a number of Federal, State, Tribal, and local fishery agencies and local interests, was formed several years ago to work toward cooperative solutions.

SPRING CHINOOK: The present average annual run size is 200 spring chinook salmon (Graeber 1989). Spawning escapement to the Dungeness River is thought to be reduced by marine interceptions and aggravated by the low summer flows. Attempts are being made through the Dungeness River Management Team to negotiate for increased flows during adult upstream migration and instream holding. An instream flow study was recently completed by the FWS to provide information for these negotiations (Wampler and Hiss 1991).

Long Live the Kings, in cooperation with the FWS, WDF, PNPTC, and the National Marine Fisheries Service (NMFS), is developing a captive broodstock rearing program on Lilliwaup Creek, a tributary to Hood Canal. The facility will be used to rear to adulthood a small number of eggs from wild, at-risk stocks and then use those adults to develop a larger broodstock to plant back to the wild. The Dungeness River spring chinook salmon is the first target species for this program. The facility is presently being built and wild Dungeness River brood fish will be captured in the fall of 1991 to begin the program.

Recommendations: 1) Continue work to enhance flows and investigate gravel build-up problem ($20,000; 0.4 FTE). 2) Participate in captive broodstock collection ($10,000; 0.2 FTE).

PINK: Pink salmon spawning escapements ranged from 14,000 to 400,000 until 1979. Since 1981, spawning escapement has ranged from 2,700 to 4,900 (Beattie 1989). The declines have been attributed to a major landslide in the spawning area and several years of scouring floods. WDF, in cooperation with FWS and PNPTC, is proposing to collect wild broodstock from the river and rear eggs and fry for release from the Dungeness Hatchery.

Recommendation: Assist WDF in their efforts to develop a hatchery-based, wild stock restoration program ($10,000; 0.2 FTE).

ELWHA RIVER

Historically, the Elwha River was the largest producer of anadromous fish on the Olympic Peninsula, providing habitat for all five species of salmon plus steelhead, cutthroat, and Dolly Varden trout. Two hydroelectric dams built just after the turn of the century block access to more than 90% of the available spawning habitat in the system. Habitat upstream of the dams remains pristine because it is in the Olympic National Park. The FWS conducted 8 years of studies to determine the feasibility of restoring anadromous fish to the Elwha River. Results indicated that restoration was infeasible with the dams in place. The FWS, National Park Service, NMFS, the Lower Elwha Tribe, and environmental groups support dam removal as the best alternative under a Federal Energy Regulatory Commission relicensing proceeding for the dams.

Recommendation: Seek a win-win situation by finding ways to remove the two Elwha dams and replacing the lost power for the Daishawa Corporation mills in Port Angeles, Washington.

OZETTE RIVER

SOCKEYE: The FWS determined that the Ozette sockeye salmon run declined from supporting a total catch of about 17,600 in 1949 to an average total run size of about 1,000 in the late 1970's (Dlugokenski et al. 1980). Since then, the Makah Tribe has been attempting to rehabilitate the run by crossing female kokanee salmon (a land-locked relative) from lake tributaries and male anadromous sockeye salmon from the lake-edge spawning population. The young from these crosses are reared in a small hatchery facility on Umbrella Creek, then transferred to a net pen in the lake, and ultimately released into Lake Ozette for final rearing before migration to the ocean. The goal is to re-establish a tributary spawning population in Umbrella Creek (Makah Fisheries Management, 1987).

Recommendation: Work cooperatively with the Makah Tribe to ensure the successful rehabilitation and to further investigate the factors limiting sockeye production in Lake Ozette ($25,000; 0.5 FTE).

QUILEUTE RIVER

SUMMER COHO: This wild run is at a low level. The Quileute Tribe and WDF manage both wild and hatchery summer coho salmon components. Harvest management should be modified so hatchery harvest does not impact the wild stocks. Since the majority of spawning occurs in the Olympic National Park, the National Park Service spawner surveys. There have also been some cooperative efforts at restocking fish in areas not presently used.

Recommendations: 1) Assist National Park Service in assessing status of wild stocks ($10,000; 0.2 FTE). 2) Encourage the Quileute Tribe and WDF to find harvest management solutions to protect wild fish. 3) Continue restocking areas not currently used.

COHO: Quileute system coho salmon is one of the coastal stocks managed for wild escapements. There have been a number of years when coastal coho have constrained the ocean salmon fishery. WDF, the Quileute Tribe, and FWS are conducting and evaluating wild fry supplementation program.

Recommendation: Expand support for the wild fry supplementation program and its evaluation ($50,000; 1.0 FTE).

SOCKEYE: There is a remnant run of sockeye salmon into Lake Pleasant. WDF and the Quileute Tribe would like to investigate the feasibility of restoring the run perhaps using net pen rearing of sockeye to increase smolt production.

Recommendation: Assist the State and Quileute Tribe to assess the status of the stock and explore restoration possibilities ($10,000; 0.2 FTE).

HOH RIVER

COHO: The Hoh River system coho salmon is another coastal stock managed for wild escapement which has been among the stocks constraining ocean fisheries (e.g., PFMC 1989). WDF and the Hoh Tribe are conducting and evaluating a wild fry supplementation program.

Recommendation: Expand support for the wild fry supplementation program and its evaluation ($50,000; 1.0 FTE).

QUEETS RIVER

SPRING CHINOOK: Spawning escapements were depressed until they began to rise in the past several years, probably due to reductions in Canadian fishing pressure. However, it is

still believed that runs are reduced from what they were in the 1950's (Hiss et al. 1990). Consideration is being given by the Quinault Indian Nation and WDF to building a wildstock supplementation hatchery in the Queets River system. The FWS has assisted the Quinault Indian Nation and WDF by assessing alternatives for collecting broodstock to restore the wild stocks.

Recommendation: Continue work to evaluate success of spring chinook salmon run and investigate restoration alternatives ($20,000; 0.4 FTE).

COHO: Queets River system coho salmon, along with other coastal stocks are managed for wildstock spawning escapements. However, there have been a number of years when coastal coho salmon have been among the stocks constraining ocean fisheries (e.g., PFMC 1989, PFMC 1990). WDF and the Quinault Indian Nation have cooperated in a wild fry supplementation program and there is an ongoing effort to evaluate its success. The Washington Department of Natural Resources is also investigating the feasibility of increasing wild coho smolt production through enhancement of mainstem juvenile coho salmon rearing habitat. The FWS is involved in a cooperative effort with all the foregoing entities to evaluate the various supplementation techniques.

Recommendations: 1) Continue attempts to increase smolt production through enhancing mainstem rearing habitat and supplementation of wild fry with hatchery-reared, wild fry. 2) Increase evaluation of that enhancement ($25,000; 0.5 FTE).

QUINAULT RIVER

COHO: The Quinault Indian Nation manages coho salmon on their Reservation. The run is managed for hatchery production by the Quinault National Fish Hatchery and the Quinault Indian Nation's Lake Quinault fish rearing facility. The National Park Service is interested in determining the status of wild stocks upstream of Lake Quinault (upstream of the Reservation boundary).

Recommendation: Provide assistance to Olympic National Park in assessing run size and restoration possibilities for Quinault River wild coho ($10,000; 0.2 FTE).

SOCKEYE: Lake Quinault is one of the few sockeye salmon producing lakes in Washington state and has produced runs as large as 1,000,000 fish in the early 1900's. However, the average for the last 20 years has been 53,000 fish. The major causes of decline are suspected to be 1) instability of major spawning grounds, 2) loss of nutrient recruitment to the lake, and 3) closure of the National Fish Hatchery on Falls Creek (Stubblefield 1990). There remain serious questions regarding the role the ecology of Lake Quinault plays in the depleted run-size relative to the hatchery closure. The Quinault Indian Nation has been conducting preliminary limnological and biological investigations in the lake. The Quinault Indian Nation and the U.S. Forest Service are presently proposing to build a hatchery on Gatton Creek (Stubblefield 1990).

Recommendation: Support further limnological and biological investigations of Lake Quinault to determine the role lake ecology plays in sockeye production ($50,000; 1.0 FTE).

CHEHALIS BASIN

Grays Harbor and its tributary streams have supported catches of coho, chum, fall chinook salmon, steelhead trout, and spring chinook salmon, in that order of importance to local catch. These runs have been depleted since the 1930's. The FWS is presently leading the development of restoration recommendations under the Chehalis River Basin Fishery Resources Study and Restoration Act of 1990.

COHO: Recent catches within Grays Harbor and its tributaries have averaged about 75,000 adult fish over the last decade, caught primarily by the Indian and non-Indian

commercial fishermen (WDF unpublished data). However, an increasing share of the catch has gone to the river sport fishery, especially on the Satsop River, where the WDF operates a hatchery. Substantial numbers of coho salmon bound for Grays Harbor are also caught offshore of Canada's Vancouver Island and the Washington coast. Grays Harbor coho have often been a constraining stock to ocean fisheries (e.g., PFMC 1989).

Recent research demonstrated that Chehalis River coho salmon smolts survived only half as well as Humptulips River smolts (Seiler 1989). Seiler reported that water pollution in Grays Harbor near Aberdeen was the most likely cause of reduced survival of juvenile coho as they migrate from the upper Chehalis River tributaries to the ocean.

CHUM: Commercial catches have averaged about 65,000 fish in the last decade, contributing mostly to the local Grays Harbor commercial Indian and non-Indian fisheries. Historical catch estimates (WDF unpublished data) suggest that the run declined during the 1930's and have since stabilized at low levels. Insufficient numbers of chum salmon have escaped the fisheries to spawn in five of the past ten years (WDF unpublished data).

FALL CHINOOK: Commercial catches have averaged about 10,000 adult fish inside Grays Harbor and its major rivers in the last decade (WDF unpublished data). The run has contributed primarily to Indian and non-Indian commercial fisheries, but an increasing catch has gone to the river sport fishery. Substantial numbers of Grays Harbor chinook salmon are also caught offshore of Alaska, British Columbia, and the Washington coast. Recent spawning escapements have failed to utilize the estimated available habitat in six of the past ten years (WDF unpublished data). Recent cutbacks in ocean catch may be responsible for increasing run sizes in the last three or four years, but full production potential will likely be achieved only if habitat quality can be restored. Chinook salmon are considered particularly susceptible to estuarine conditions because they reside in the estuary longer than other species, spending several months before migrating to the ocean.

WINTER STEELHEAD: Catch in the Grays Harbor system has averaged 9,000 fish over the past decade (WDW unpublished data). The run has contributed primarily to the Quinault Tribal fishery and the non-Indian river sport fishery. Some tenuous evidence suggests significant interception by the international high seas gillnet fishery. Overall, steelhead trout runs are apparently healthy; the tributaries of the upper Chehalis River have not usually received the required number of spawners (WDW unpublished data). As with coho salmon, poor habitat condition is suspected. Biologists familiar with Grays Harbor generally agree that water quality problems affecting coho salmon very likely will also affect Chehalis River origin steelhead as well since these fish migrate through the same area at roughly the same time.

SPRING CHINOOK: Expected low returns of spring chinook salmon have constrained ocean fisheries at times (e.g., PFMC 1989, PFMC 1991b). In-river catch has been restricted heavily to protect natural spawning. Catches over the last decade averaged 200 fish, all caught by the Chehalis Tribe (WDF unpublished data). Recent escapements have failed to utilize the estimated available habitat in seven of the past ten years (WDF unpublished data), but as with fall chinook salmon, recent improvements have been observed. There is potential for opening a river sport fishery if the run can continue its recovery. Biologists familiar with Grays Harbor generally agree that water quality problems affecting coho salmon very likely also affect Chehalis River spring chinook, since these fish migrate through the same area at roughly the same time.

Recommendations: 1) Provide full funding ($825,000; 2.0 FTE) for the Chehalis River Basin Fishery Resources Study and Restoration Act. 2) Fully fund any recommendations resulting from Chehalis River Basin Fishery Resource Study and Restoration Act of 1990.

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